

SUPPORTING DOCUMENT E

Existing Conditions

Environmental Inventory

The Upper Swift Creek Plan is one three plans for the watershed area draining to the Swift Creek Reservoir. The Upper Swift Creek Watershed is rich with natural resources that if managed properly should provide for the water quality benefits needed for the preservation of the Swift Creek Reservoir. An environmental resource inventory (ERI) was performed as part of the *Watershed Management Master Plan* (2000). Many of the ERI features are continually updated, to reflect additional data and changing field conditions. The ERI is a planning tool that includes information about and location of the physical and natural features that are determined important within the boundaries of the watershed. By using this tool to identify natural resources that help maintain water quality, the county can protect the tributaries and the Reservoir in an efficient, cost effective manner.

Swift Creek Reservoir Watershed Boundary:

The watershed covers 61.5 square miles or approximately 42,000 acres with portions of three magisterial districts overlaying its boundaries. Generally located west of Route 288 between Route 360 and Genito Road, 85% (35,000 acres) is contained within Chesterfield County with the remaining 15% in Powhatan County. The delineation of the watershed drainage boundaries is important because that boundary defines the portion of the County to be considered when establishing protection measures for source water (drinking water). The watershed can be divided into eight sub-watershed areas. By segmenting the delineation, management efforts may be targeted to those areas that are most vulnerable to water quality degradation and therefore are the highest priority to protect or restore. Moving downstream the, those stream segments that are closest to the Reservoir will have the greatest impact on its water quality, while those stream segments at the top of the watershed may have less of an impact on water quality (see Figure 1).

Hydrology (Tributary Streams):

The Swift Creek Reservoir Watershed is made of a network of eleven streams over 248 miles long that combine to form eight sub-watersheds, which flow directly into the Reservoir:

- Little Tomahawk Creek
- Tomahawk Creek
- Swift Creek/Turkey Creek
- Otterdale Creek
- Horsepen Creek/Blackman Creek/Deep Creek
- West Branch
- Dry Creek
- Fuqua Creek

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The Swift Creek/Turkey Creek system drains the largest area (35 percent or approximately 14,700 acres) and the Fuque Creek drains the smallest area (4 percent or approximately 5880 acres) of the watershed. The networks of streams carry drainage from groundwater and storm flows. The physical and chemical degradation of these systems will result in increases pollutant loads, significantly affecting the water quality downstream. These effects of degradation can be further exacerbated if the stream systems become unstable and disconnected from floodplains and wetlands (see Figure 2).

Geologic Features:

The Upper Swift Creek Watershed is located in the Richmond coalfield, situated on a structural basin filled with Triassic-age sediments. This basin extends to parts of Goochland, Henrico, Amelia, and Powhatan Counties. The watershed contains the part of the Clover Hill Mining District as identified in the Virginia Division of Mineral Resources Publication 85 "Mining History of The Richmond Coalfield of Virginia." Mining operations in the watershed consisted of Coate's Pits and Hill Shaft, which were the northernmost workings in the District. Both operations were shut down by the mid 1800s. Another geologic feature of note is the existence of petrified wood formations found primarily in the Otterdale and Tomahawk Creek watersheds. The watershed also contains a large number of established spring fed ponds typically found in the upper reaches of sub-watersheds. Many streams in the watershed have been found to have their origin at or near groundwater springheads. While not unique to this watershed, these ponds and springs illustrate the importance that groundwater resources have played in the history of the area (See Figure 3).

Wetlands:

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soils conditions. These wetland resources are especially valuable for the protection and preservation of terrestrial and aquatic habitats and wildlife. In their natural conditions they provide flood control, water quality and maintain stream flow. Often these wetlands can be damaged by alterations to their associated streams. For example, down cutting, caused by increased storm flow volumes to a stream can lead to a draining or a drying of the wetland, reducing its quality and the overall water quality of the stream. Providing additional forested buffer for wetland resources will work to keep these systems intact, protecting the water quality of the Reservoir.

Wetlands account for approximately 5289 acres or 12 percent of the total acreage of the Swift Creek Reservoir Watershed. The greatest wetland acreage is concentrated at the lower stream reaches, near the head of the reservoir. Acreage decreases progressively upstream and is minimal at the headwaters. The greatest wetland acreage and diversity are associated with Swift Creek (approximately 853 acres or 16 percent) while the least acreage and diversity is associated with Little Tomahawk Creek (approximately 146 acres or 3 percent). The Horsepen Creek/Blackman Creek/Deep Creek system accounts

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for approximately the second largest wetland acreage (approximately 519 acres or 10 percent) within the watershed (see Figure 4).

The dominant wetland type found is palustrine forested or bottomland hardwood forest. Bottomland hardwood forests are flat lowlands along streams or rivers usually on alluvial floodplains that are periodically flooded. They generally have a linear form as a consequence of their proximity to streams. Many of the stream systems in the watershed are associated with high quality wetlands. Swift Creek, Horsepen Creek and Blackman Creek contain a combination of large forest wetlands, high quality scrub-shrub and emergent wetlands.

Reservoir, Lakes & Ponds:

The Swift Creek Reservoir was constructed in 1966 and includes a 1,700-acre impoundment with 5.0 billion gallon capacity. Its mean depth when full is nine feet. The plant has a production capacity of 12 Mgal/Day. An additional 221 acres of impoundments (ponds and lakes) can be found throughout the Swift Creek Reservoir Watershed. These ponds were created as recreational or farm ponds facilities. As development occurs these facilities will have stormwater treatment potential.

Topography and Soils:

Soils have inherent characteristics that control their ability to retain or transmit water, and their stability. The Swift Creek Reservoir Watershed lies west of the Fall Line within the Central Piedmont Physiographic Province. The topography of the planning area consists principally of flatlands and gently rolling hills typical of this region. The *Soil Survey of Chesterfield County, Virginia* (U.S. Department of Agriculture-Soil Conservation Service [USDA-SCS], 1978) indicates the dominant soil association found within this area is Creedmor-Mayodan. This association is formed from material weathered from Triassic sandstone and shale compressed together (see Figure 5). The soils can be characterized as well drained clayey to gravelly clayey. They are low in organic-matter content, low in natural fertility, and can be strongly acidic. The soil survey also identifies eight hydric soil series within the watershed that are associated with floodplains, drainageways, and depressions and their runoff potential (see Figure 6). Knowledge of soil sciences is an important factor in determining the amount of erosion and stormwater runoff that could occur during development. This knowledge is also important for the application of available land management techniques and alternative stormwater treatments.

Flood Plains:

Flooding is a natural process that protects stream channels and beds from erosive forces during elevated storm flows. When inundated, the floodplain acts as a natural flood and erosion control, decreasing the magnitude of floods downstream. Decreasing the magnitude of flooding is beneficial for landowners in riparian areas and aquatic wildlife. In addition, the floodplain protects water quality by filtering runoff and promoting groundwater recharge. Finally, floodplain wetlands act as nutrient and sediment sinks,

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which also improves water quality in streams. This land area serves many functions and provides important habitats for wildlife (see Figure 7).

Stream Corridor Buffer:

In response to the Chesapeake Bay Preservation Act of 1988, Chesterfield County enacted the Chesapeake Bay Preservation Ordinance in 1990 (Ordinance). The ordinance protects environmentally sensitive features from improper development that would contribute to the significant degradation of the water quality of the County's waters, which drain into the Chesapeake Bay. Chesapeake Bay Preservation Areas include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs), which are subject to the criteria set forth in the Ordinance.

RPAs are environmentally sensitive lands at or near the shoreline that have an intrinsic water quality value due to the ecological and biological processes they perform or are sensitive to impacts that may cause significant degradation to the quality of County waters. In their natural condition, these lands provide for the removal, reduction, or assimilation of sediments, nutrients, and pollution runoff entering the Chesapeake Bay and its tributaries. RMAs are land types that, if improperly used or developed, have a potential for causing significant water quality degradation or for diminishing the functional value of the RPA.

The RPA boundaries include 100-foot-wide buffers adjacent to and landward of the nontidal wetlands. The County has generally mapped RPA boundaries within the Swift Creek Reservoir Watershed according to hydric soil maps from the Soil Survey of Chesterfield County, Virginia. The RPA boundary extends 100-feet outward from the hydric soil boundary. In 2004, amendments to the Ordinance required site-specific determinations of perennial flow which thereby requiring buffers to be located along these stream segments. The County Resource Protection and Boundaries map identifies this buffer (see Figure 8). The area of RPA within the Swift Creek Reservoir Watershed, as of July 2006, was approximately 8.52 square miles or 5,454 acres. This includes 149,934 feet or 28.4 miles of perennial stream.

Rare, Threaten and Endangered Species:

Identification and protection of areas that contain rare, threaten and endangered species require special concerns. As described in the assessment conducted in 2000, Swift Creek Watershed has no federally endangered species known to exist within its bounds. Several species of plants are considered state-rare with one amphibian (Barking Tree Frog) considered state-threatened. The Bald Eagle was the only species considered both state and federal threatened.

Wildlife:

A vast array of wildlife to include deer, beavers, fox, hawks, eagles, ospreys, waterfowl, and heron rookeries are found along the Reservoir, wetlands, and forests throughout the

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watershed. A state birdwatching route cuts through the center of the watershed along Genito Road. The Reservoir has an abundant population of finfish, which includes the highest number of state citations for Chain Pickerel in 2005. Protecting contiguous forest and riparian corridors from development and encroachment is fundamental to maintaining a healthy wildlife population throughout the watershed.

Cultural Resources:

Background research to locate and identify documented cultural resources in the Swift Creek Reservoir Watershed was conducted by CH2M HILL in 2000. This information was used to develop historic contexts for evaluating the archaeological and architectural resources located in the watershed. Information on documented cultural resources was obtained from the Virginia Department of Historic Resources (VDHR) in Richmond, Virginia. Figure 9 shows the location of historic structures and documented archaeological sites in the watershed. Due to the rich natural resources of the area many of the historic structures located in this area can be found associated with these resources in the form of spring houses, mill runs, and earthen dams.

Figure 1

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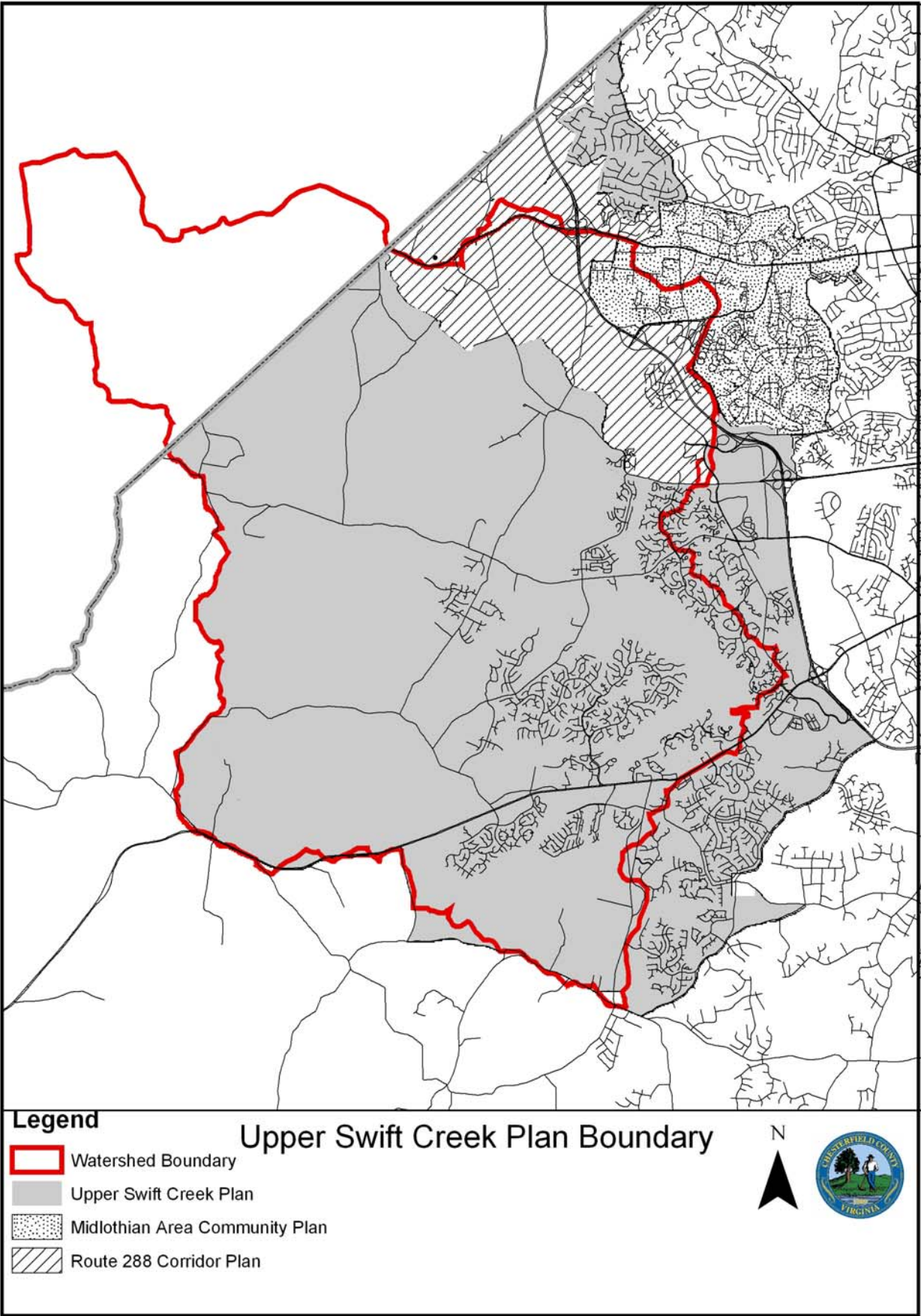


Figure 2

Environmental Inventory

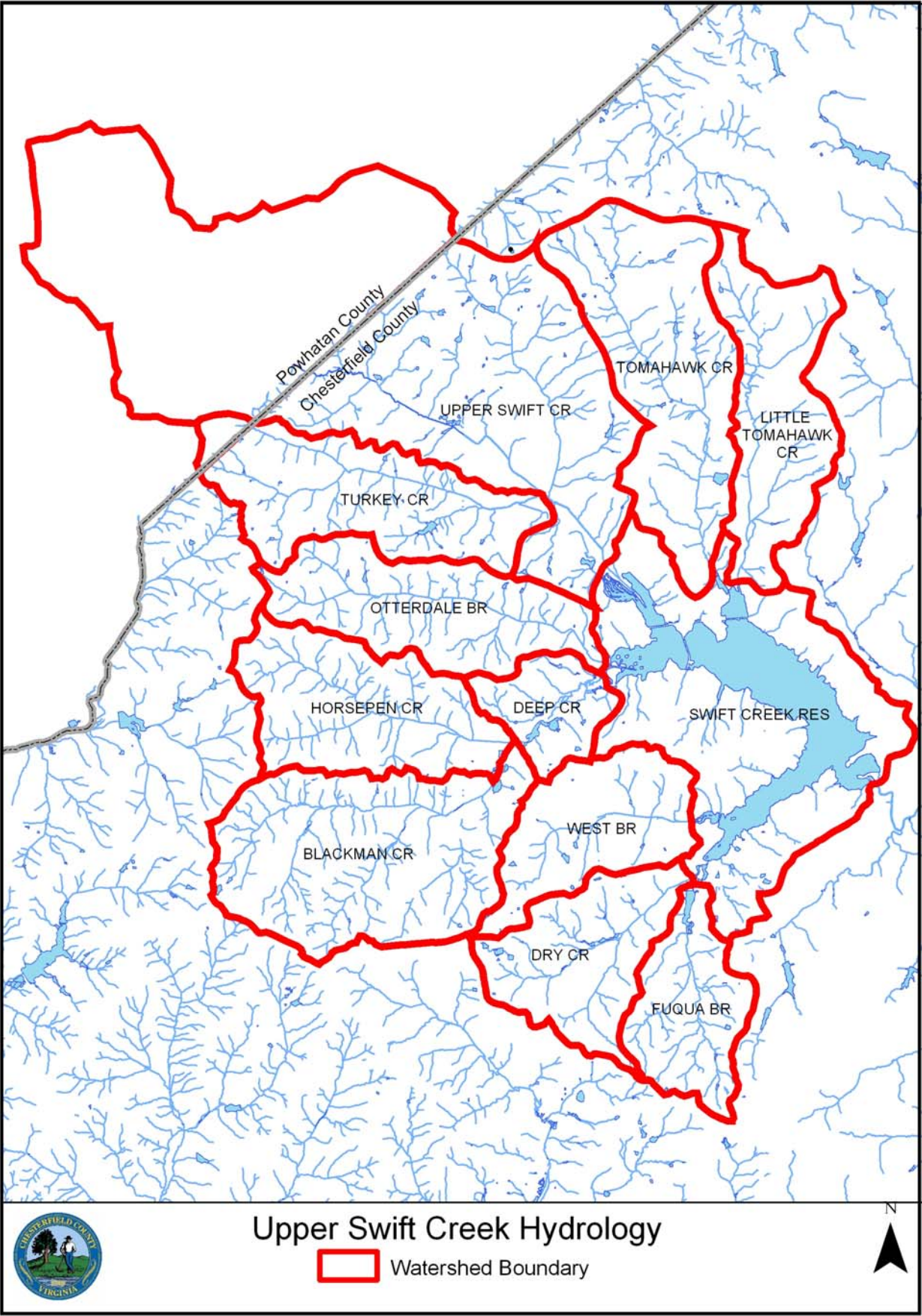


Figure 3

Environmental Inventory

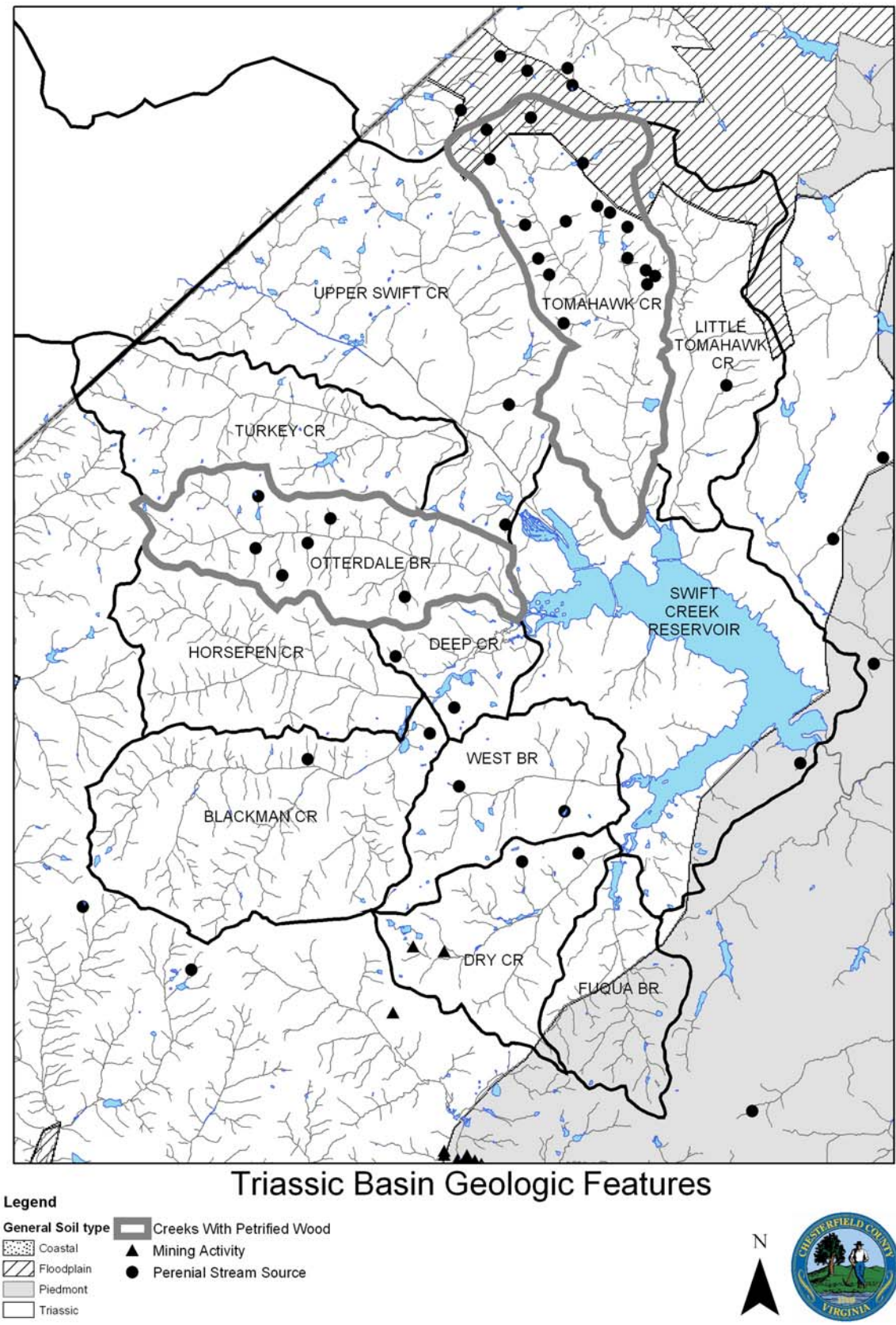


Figure 4

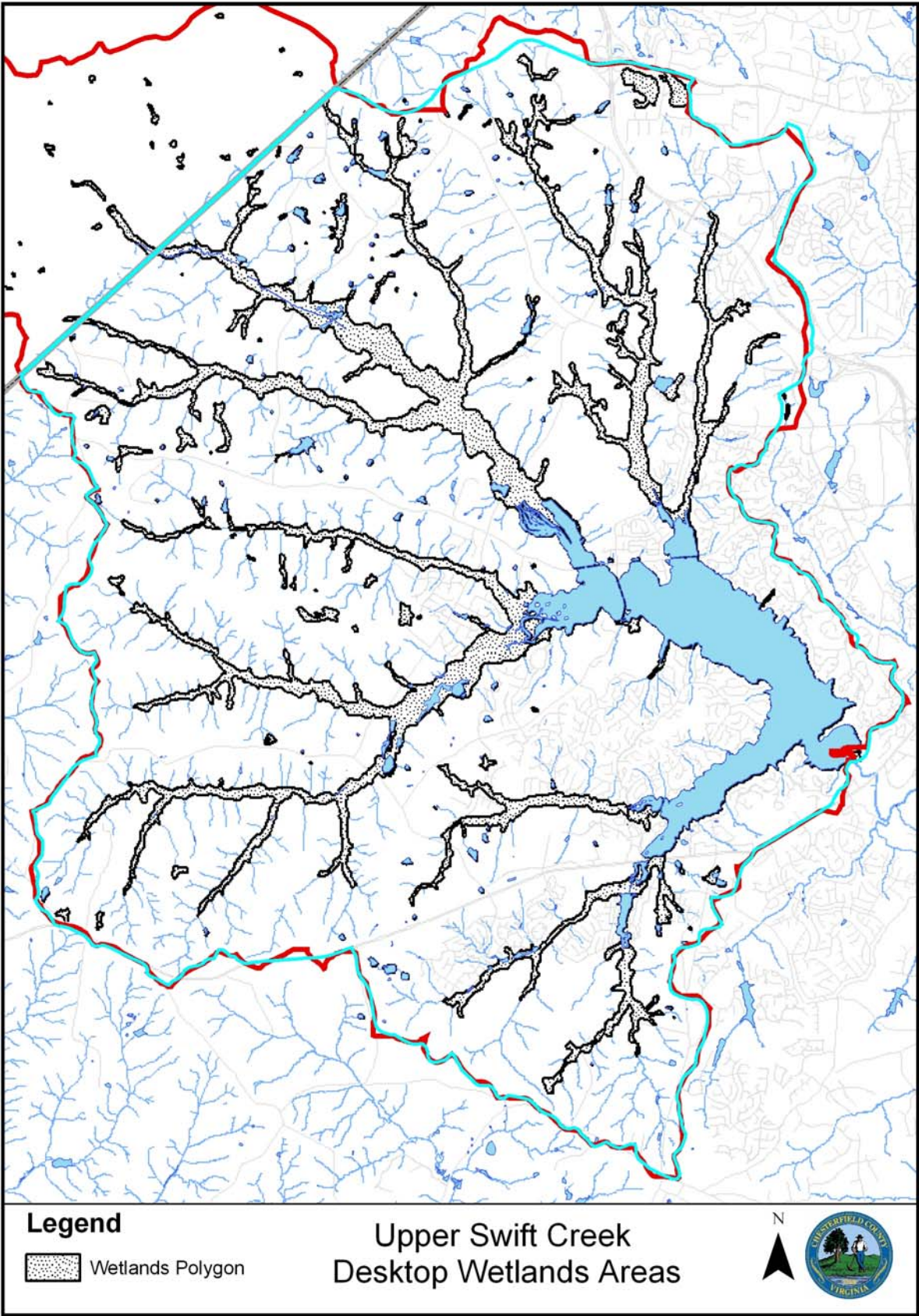


Figure 5

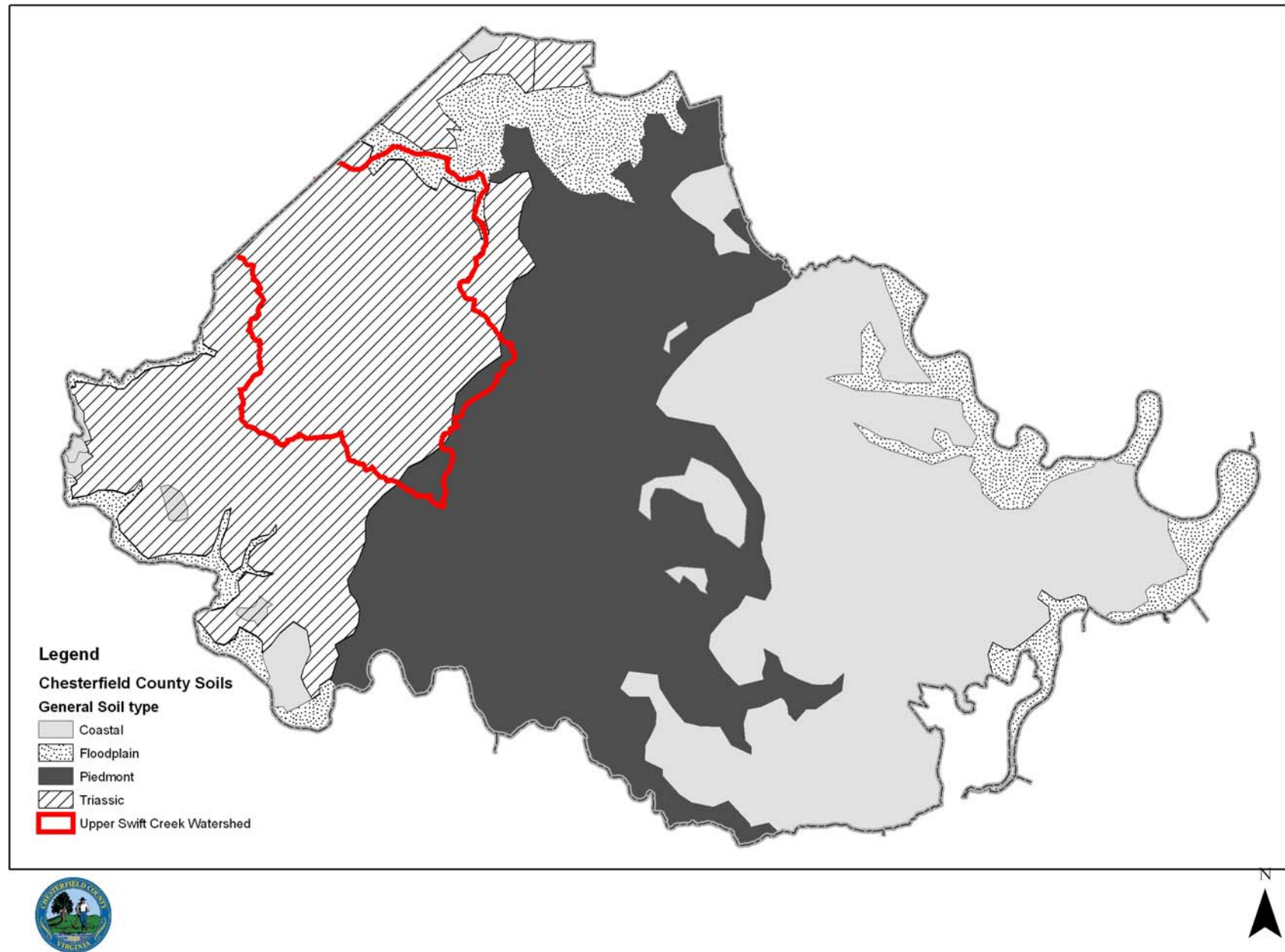


Figure 6

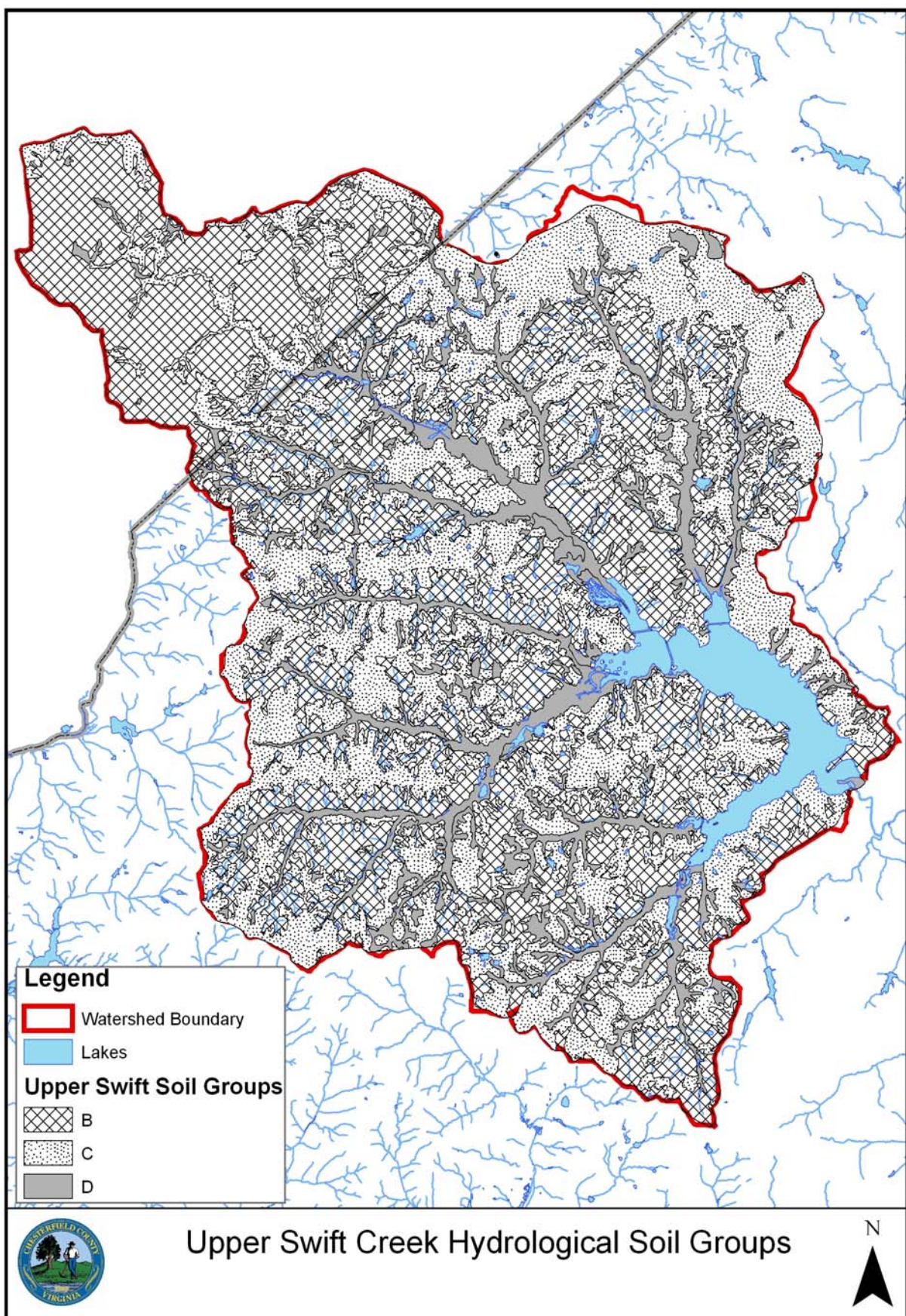


Figure 7

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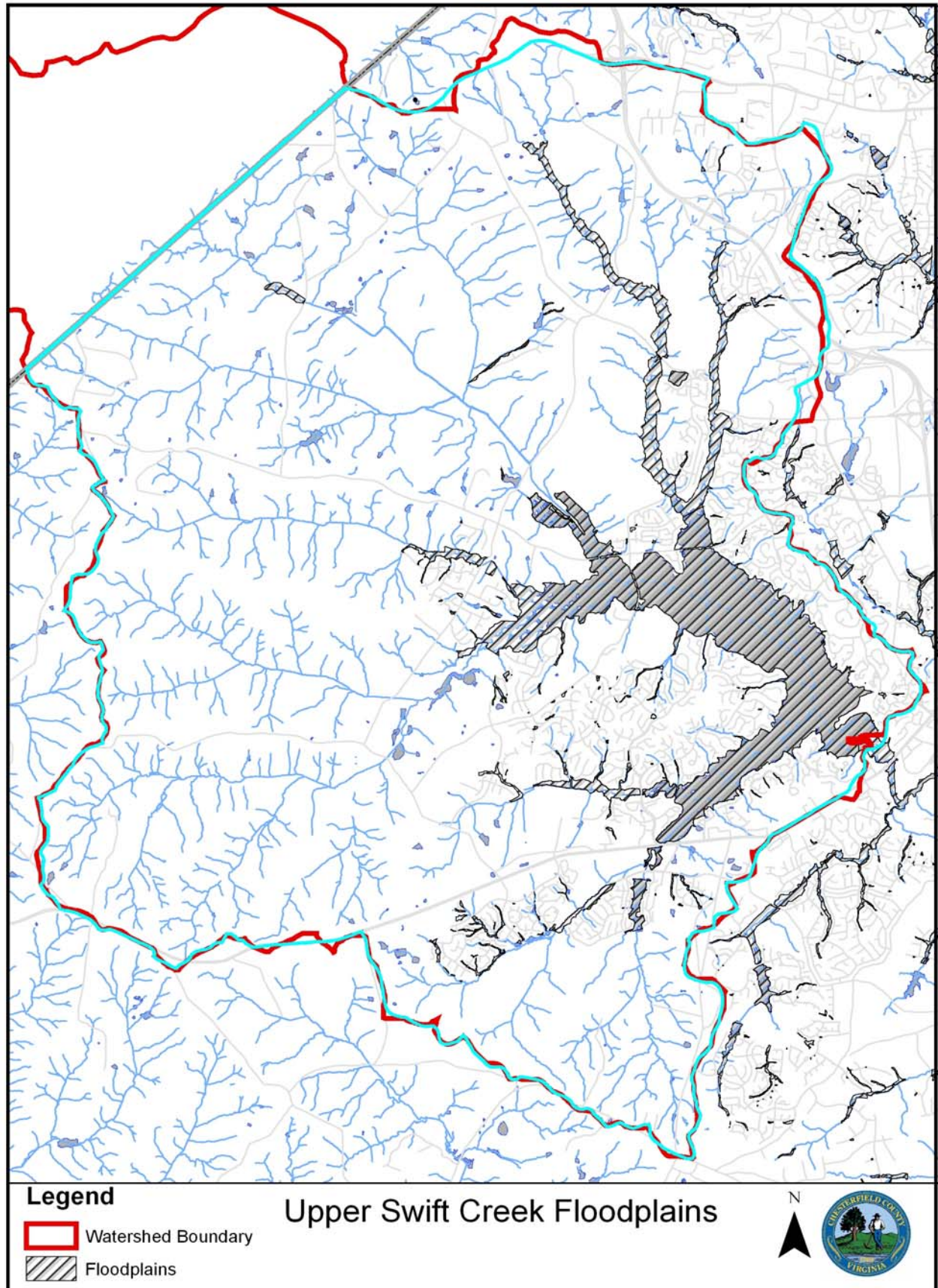


Figure 8

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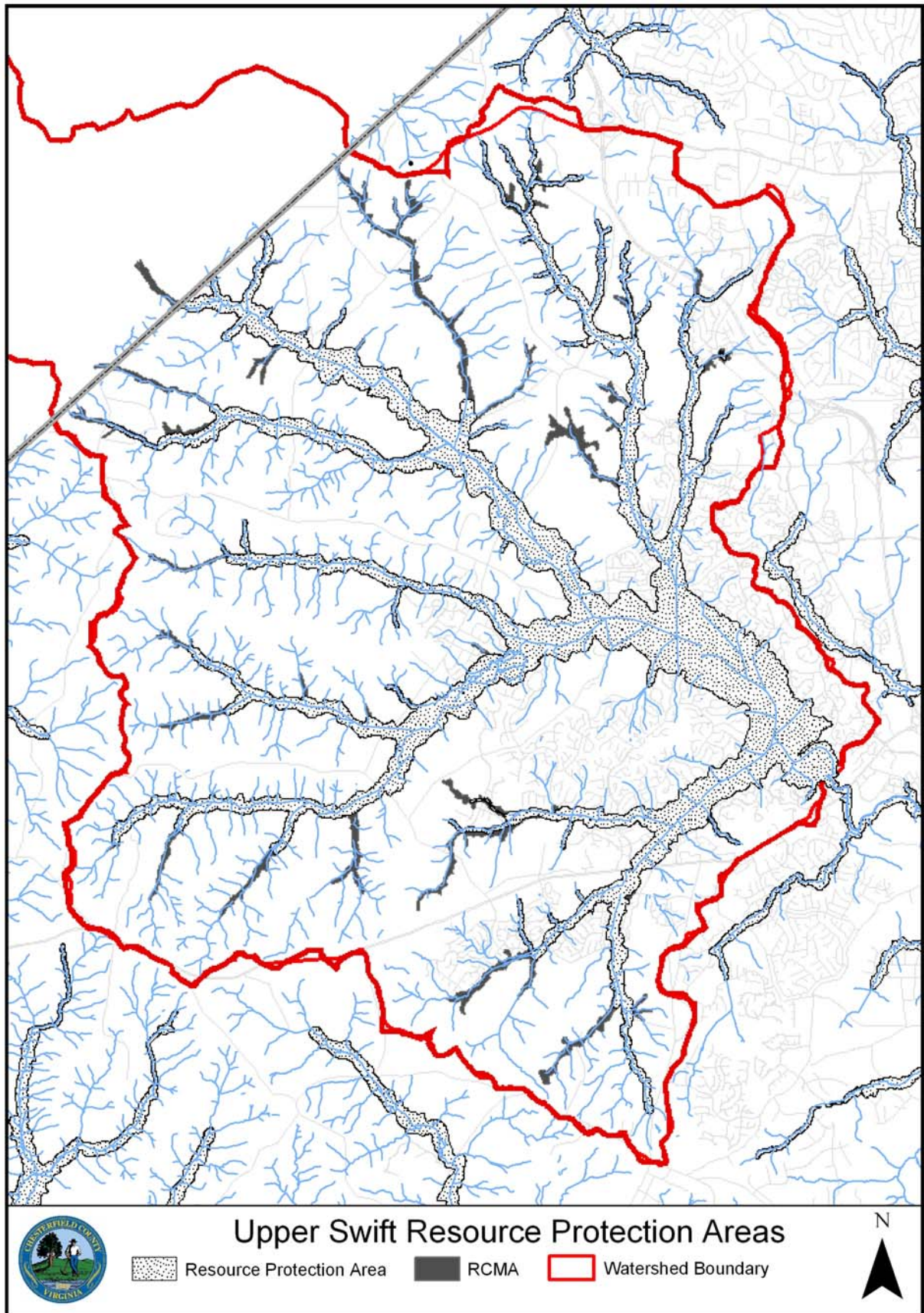


Figure 9

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